California State Water Resources Control Board

Office of Water Recycling

CALIFORNIA MUNICIPAL WASTEWATER RECLAMATION SURVEY

May 24, 2000

A summary of reclaimed water use occurring in California is provided herein and is based on an updated survey conducted by the State Water Resources Control Board's Office of Water Recycling. The estimated total amount of treated municipal wastewater that is being reused is 402,000 acre-feet per year.[1] This represents a 50 percent increase from a detailed survey undertaken by the State Water Resources Control Board in 1987. The wastewater is produced by 234 treatment plants and is being reused at approximately 4,840 sites.

The survey contains information on each of these treatment plants and use sites. Information is provided on location by county, name of the treatment plant, treatment processes and capacities, amount and type of reuse by user or groups of similar users, pricing data, and the last month for the twelve-month period for which data are presented. An additional table is provided which summarizes the type and amount of reuse by hydrographic region. A map showing the hydrographic regions and a list of abbreviations are also provided.

Definitions

Terms regarding wastewater reclamation are not consistently used in the literature. The following definitions are used in this report:

"Reclaimed water", also called recycled water, means water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur.

"Water or wastewater reclamation" includes the process of treating wastewater to produce water for beneficial use, the storage and distribution of reclaimed water to the place of use, and the actual use of reclaimed water.

[1] This estimate may be different than ones provided by other organizations. The section Focus of Survey describes the criteria for including or excluding projects. Several projects have been identified as using reclaimed water; however, because data have not yet been obtained to verify these projects, they are not included in this estimate. These potentially missing projects are believed to amount to less than 1 percent of the total statewide reclaimed water use.

"Planned reuse" is the deliberate direct or indirect use of reclaimed water without relinquishing control over the water during its delivery.

"Direct reuse" is use of reclaimed water that has been transported from a wastewater treatment plant to a reuse site without passing through a natural body of either surface or groundwater.

"Indirect reuse" is the use of reclaimed water indirectly after it has passed through a natural body of water after discharge from a wastewater treatment plant.

"Municipal wastewater", for purposes of this survey, is wastewater of domestic origin and of commercial, industrial, and governmental origin if such wastewater is commingled with domestic wastewater prior to treatment.

Focus of Survey

The focus of this survey is on planned direct reuse of treated municipal wastewater. Examples of such uses would include irrigation of agricultural or landscape plots; industrial cooling or processing; and recreational impoundments. Planned groundwater recharge with reclaimed water is considered in this survey as a type of direct reuse, even though it is more correctly considered as temporary storage before actual indirect reuse takes place upon extraction from the ground. With few exceptions, all of the uses listed in this survey are regulated by the Department of Health Services and are subject to Title 22 of the California Code of Regulations, Sections 60301 et seq.

A distinction is made between land application of wastewater for the purpose of treatment or disposal and land application that results in water reclamation and reuse. These two categories are not mutually exclusive and are frequently overlapping. Land application is considered wastewater reuse as long as an intentional benefit results from the use of the reclaimed water. Beneficial uses may include, for example, irrigation of pasture or of crops that are harvested. Thus, insofar as a beneficial use is being derived, land treatment or disposal of wastewater is considered water reclamation, even though fresh water may not be replaced and irrigation methods may not be efficient with respect to crop needs.

A substantial amount of unplanned reuse occurs throughout California, either through diversions from streams downstream from wastewater discharges or from percolation of treated wastewater in stream beds. No attempt has been made to estimate the amount of unplanned reuse. The percolation of effluent through rapid infiltration, as in ponds, intended primarily as a method of wastewater treatment and disposal, is not considered planned

reuse. Unplanned indirect reuse of effluent percolated in stream beds constitutes a significant component of groundwater supply for some communities, but this type of reuse is not within the purview of this survey.

Treated municipal wastewater can result in environmental enhancement of wildlife habitat or aesthetic qualities of water bodies and riparian zones. Wetlands for habitat or hunting, streamflow enhancement to maintain a fishery, or streamflow to enhance riparian vegetation for aesthetic enjoyment are examples of environmental enhancement. These environmental benefits are often incidental to the discharge of wastewater and not within the scope of planned direct reuse. Each case potentially within the scope has been evaluated and included when appropriate. As new information is available in future survey updates, environmental uses cited in this survey may be removed or new ones added.

In-plant use of treated effluent at wastewater treatment plants is common practice, such as backwashing of filters, wash-down of equipment, and on-site landscape irrigation. Treated wastewater used for routine in-plant purposes is not included in the data presented in this survey.

Conduct of Survey

The State Water Resources Control Board conducted a comprehensive survey of water reclamation in California for the year 1987. It was accomplished by a mass mailing of a detailed questionnaire to all known agencies producing reclaimed water for reuse.

This survey uses a new approach. It is part of an on-going survey in which the data for agencies will be updated at differing frequencies depending on the amount of reuse and the anticipated rate of changes expected. Thus, each year, many of the large reclamation projects will be resurveyed and new projects will be added. The remaining projects will be resurveyed at longer intervals, perhaps up to five years. In this way, the survey at any given time will provide a reasonable estimate of the total reuse occurring. Because of this approach, many of the smaller projects and some larger projects are still based on 1987 data. Statewide, roughly 80 percent of the wastewater reclamation is done by 20 percent of the treatment plants involved in reclamation.

An attempt is made to identify every wastewater treatment plant that is producing reclaimed water for reuse, all of the types of reclaimed water use occurring, the amounts of reuse at each plant broken down by type of reuse, and total number of sites where each type of reuse is taking place. Much of the updated information was obtained by use of a questionnaire. However, other sources include annual monitoring reports submitted by the reclaiming entities to the Regional Water Quality Control Boards, annual reports submitted on completed water

reclamation projects funded by the State Water Resources Control Board, telephone interviews, and review of waste discharge or reclamation requirements. Another important source is the Annual Status Report on Reclaimed Water Use, which is issued by the County Sanitation Districts of Los Angeles County and provides reuse information at ten District plants.

The survey will continue to be updated whenever sufficient new data has been obtained. It is anticipated that this will occur at 6 to 12 month intervals and the updated information will be posted at this website.

Additional information may be obtained by contacting:

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Any information in regard to errors or omissions would be appreciated.

Copies of the 1987 survey are still available. The 1987 survey covered several additional issues, including an estimate of the amount of freshwater savings resulting from reclaimed water use, the pricing practices for reclaimed water, the levels of treatment provided, and the motivation for implementation of water reclamation. Also, a more detailed statistical breakdown was provided, such as by geographical region or types of use.

LIST OF ABBREVIATIONS

AF	acre-foot
AQ	aquatic treatment
AS	activated sludge, including oxidation ditch
C	coagulation/flocculation
CA	California or carbon adsorption
CH	chlorination
Co.	Company
Comm Serv Dist	Community Services District
Cnty	County
CSD	County Sanitation District
CWD	County Water District
D	disinfection
DC	dechlorination
Dept	Department
DF	dissolved air flotation
Dist	District
F	filtration
Inc	Incorporated
Irr	Irrigation
MF	microfiltration
MGD	million gallons per day
MWD	Municipal Water District
NR	denitrification
OP	oxidation ponds, including aerated lagoons
PS	primary sedimentation
PUD	Public Utility District
RB	rotating biological contactor
Reg	Regional
RO	reverse osmosis
RS	rotary screens
RWQCB	California Regional Water Quality Control Board
San	Sanitation
SD	Sanitary District
ST	air stripping
STP	Sewage Treatment Plant
SWRCB	California State Water Resources Control Board
TF	trickling filters
TP	Treatment Plant
UV	ultraviolet disinfection
W	wetlands
WD	Water District
WPCF	Wastewater Pollution Control Facility
WPCP	Water Pollution Control Plant
WQCF	Water or Wastewater Quality Control Facility
WQCP	Water Quality Control Plant
WRF	Wastewater Reclamation Facility
WRP	Water Reclamation Plant
WTF	Wastewater Treatment Facility
WTP	Wastewater Treatment Plant
yr	year